Hertel Landfill Superfund Site

Plattekill, Ulster County, New York

EPA
Region 2

July 2004

EPA ANNOUNCES POST-DECISION PROPOSED PLAN

This Post-Decision Proposed Plan describes the proposed fundamental changes to the July 1991 Record of Decision (ROD) issued by the United States Environmental Protection Agency (EPA) with respect to the Hertel Landfill Superfund Site and concurred on by the New York State Department of Environmental Conservation (NYSDEC).

The remedy specified in the 1991 ROD required capping of the site, restrictions on the future use of the site, and contaminated groundwater extraction with on-site innovative treatment. As described in this Post-Decision Proposed Plan, EPA is proposing that the extraction and treatment of groundwater is no longer necessary to ensure the protection of human health and the environment.

The Post-Decision Proposed Plan was developed by the EPA in consultation with NYSDEC. EPA is issuing the Post-Decision Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended (commonly known as the federal "Superfund" law), and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). EPA encourage's the public to review these documents to gain a more comprehensive understanding of the site and Superfund activities that have been conducted at the site.

This Post-Decision Proposed Plan is being provided to inform the public of EPA's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, as well as the preferred alternative. The alternative described in this Post-Decision Proposed Plan is the *preferred* alternative for the site. Changes to the preferred alternative or a change from the preferred alternative to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered because EPA may select a remedy other than the preferred remedy.

MARK YOUR CALENDAR

Public comment period:
July 28, 2004 - August 28, 2004
U.S. EPA will accept comments on the Post Decision Proposed Plan during this public comment period

Public Meeting:
August 11, 2004 at 7:00 p.m.
U.S. EPA will hold a Public meeting to explain the Post Decision Proposed Plan. The meeting will be held at Clintondale Fire Department, Clintondale, New York.

For more information, see the Administrative Record file, which is available at the following locations:

Plattekill Town Hall
P.O. Box 45
Modena, New York 125548
Tel. 845-883-7331
Hours: Monday - Friday 9:00am - 3:30pm

Plattekill Public Library
Route 32
P.O. Box 25
Modena, New York 125548
Tel. 845-883-7286
Hours: Monday and Friday 1:00pm - 6:00pm , Tuesday 1:00pm -8:00pm , Wednesday and Thursday 10:00am - 8:00pm , Saturday 10:00am - 3:00pm

USEPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
(212) 637-4308
Hours: Monday-Friday, 9:00 a.m. - 5:00 p.m.

Written comments on this Proposed Plan should be addressed to:

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New York, NY 10007-1866
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COMMUNITY ROLE IN SELECTION PROCESS

EPA relies on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. Similarly, EPA also relies on public input when proposing fundamental changes to a remedy previously selected. To this end, this Post-Decision Proposed Plan and the Sampling Inspection Reports have been made available to the public for a public comment period which begins on July 28,2004 and concludes on August 28, 2004

A public meeting will be held during the public comment period at the Clintondale Fire Department, Clintondale, New York on August 11, 2004 at 7:00 P.M. to elaborate on the reasons for the proposed amendment to the ROD and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary section of the Record of Decision Amendment (ROD Amendment), the document which formalizes the selection of the remedy.

SCOPE AND ROLE OF ACTION

The primary objective of this Proposed Plan is to present an Amendment to the July 1991 ROD for the Hertel Landfill Superfund Site (site). The remediation goal of the ROD is to reduce, within a reasonable time, the site groundwater and surface water contaminant levels to ambient surface water and groundwater Applicable or Relevant and Appropriate Requirements (ARARs). The remedy chosen by EPA in the 1991 ROD included the construction of a permanent cap over the site landfill area and a system to collect leachate from the landfill waste. These aspects of the remedy have been implemented.

The ROD remedy also included a groundwater pump and treat system which has not been implemented. However, EPA nows believes that the pump and treat system is no longer necessary. The installed permanent cap and leachate collection system have reduced the migration of contaminants sufficiently to improve the site groundwater quality to the extent that the added expense of the pump and treat system is not warranted. As part of the landfill post closure monitoring program, groundwater and surface water sampling was conducted. Using this data, a Human Health Risk Assesment was performed which determined that no human health cancer risks or non-cancer health hazards associated with the groundwater contamination exist at this site.

Since Human Health Risks are controlled and there is a potential loss of wetlands if the original groundwater remedy is implemented, EPA has developed this proposed plan to evaluate the following three alternatives for the groundwater remedy for this site: 1) No Further Action, 2) Institutional Controls and Long-Term Monitoring, and, 3) the original groundwater extraction and treatment remedy selected in the 1991 ROD.

SITE BACKGROUND

Site Description

The site is located in the Town of Plattekill, Ulster County, New York, just south of U.S. Route 44/NY Route 55 and approximately midway between Bedell Avenue and Tuckers Corner Road. Wetlands border the site property to the north, south, and east, and a small unnamed stream crosses the southern and eastern portion of the site and flows adjacent to the landfill. The unnamed stream flows into Pancake Hollow Creek and then Black Creek and the Hudson River. An approximate 15-acre portion of the 80-acre site property is an inactive waste disposal area that was established in 1963 as a municipal waste landfill.

The site and the area surrounding the site are zoned residential. Approximately 1,350 people live within three miles of the landfill. There are about 500 people living within a mile of the site. Residents within the area obtain their drinking water from individual wells. No permanent structures are located on the site. A locked gate exists across the unpaved main access road near Route 44/55. A six-foot high chain link perimeter fence has been erected around the northern, western, southern, and southeastern boundaries of the landfill area. The fence acts to prevent unauthorized personnel from entering the site.

Site Geology/Hydrogoelogy

There are two aquifers that exist beneath the site. The bedrock material is the Austin Glen formation and described as a greywacke and shale; variegated light blue to blue-grey fine- to medium grained sandstone (greywacke) with occasional seams of shale have been observed. The rock has well-defined bedding planes and the upper few feet are slightly weathered. The overburden is a glacial till deposit consisting of an mixture of material (clay, silt, sand, gravel, and boulders) which widely range in size, shape, and permeability. Overlying the till deposit is a layer of light brown fine sand and silt.

Site History

The Hertel Landfill was established in 1963 as a municipal waste landfill. Approximately fifteen acres of the site property were used for disposal. Until 1975, the landfill was owned and operated by Carlo Hertel and later by his family through their company, Hertel Enterprises. In 1970, Dutchess Sanitation Services, Inc. began hauling refuse from Dutchess County to the Hertel Landfill and in 1975, Dutchess Sanitation Services, Inc. purchased the landfill.

In 1976, the Ulster County Department of Health (UCDOH) revoked the landfill permit for a variety of violations, among which were allegations of illegal industrial dumping. This UCDOH action and a Town of Plattekill ordinance prohibiting the dumping of out of town garbage resulted in the permanent closing of the Hertel Landfill in March 1977.

Sampling and analysis of site groundwater in 1980 and 1982 revealed measurable amounts of several metals. Three leachate samples were collected in March and May 1981 by NYSDEC. Analyses of these samples detected phenols, organic compounds, and a number of metals. Based on these results, NYSDEC placed the Hertel Landfill

Site on the New York State Registry of Inactive Hazardous Waste Disposal Sites. In 1983, the site was recommended for inclusion on the National Priorities List (NPL) by NYSDEC and in October 1984, EPA proposed the Hertel Landfill site for inclusion on the NPL. In June 1986, the site was placed on the NPL.

EPA conducted a Remedial Investigation/Feasibility Study (RI/FS) of the site between 1989 and 1991. The scope of the investigation included geophysical surveys, soil gas screening, test pit excavations, soil borings, and monitoring well installation. Samples were collected from surface water, sediment, groundwater, surface soils, subsurface soils, and leachate seeps. The results of the RI revealed the presence of low levels of volatile organic compounds (VOCs) and metals at concentrations above background levels in groundwater, surface water, sediment, and soil samples. In September 1991, based on the results of the RI/FS, EPA issued a ROD for the site.

In September 1992, EPA issued a Unilateral Administrative Order (UAO) to six Potential Responsible Parties (PRPs), directing them to perform the remedial design/remedial action (RD/RA). Ford Motor Company (Ford) was the only PRP at the time to comply with the UAO. In 1994, Ford completed a pre-design investigation for the site which defined the extent of the landfill mass, modeled site groundwater dynamics and characterized soil, groundwater, surface water, and sediment contamination. The groundwater modeling predicted that a groundwater pump and treat system, if implemented, may have a detrimental impact on the wetlands immediately adjacent to the landfill, without achieving the goal of remediating groundwater contamination in the saturated zone.

In addition, Ford installed gas probes to monitor potential landfill gases generated by the decomposition of landfilled material and, in 1995, installed a locked chain link fence to prevent unauthorized access to the landfill.

The remedial pre-design investigation, which formed the basis of the design of the landfill cap, was approved by EPA in September 1996. Thereafter, initial work for the construction of the cap began with the removal of vegetation growing over the landfill area, as well as the implementation of erosion control measures. In February 1997, EPA issued a second UAO to eight additional PRPs, directing these parties to cooperate and participate in the site cleanup with Ford and with Golden Books Publishing Co., Inc. (formerly Western Publishing Co., Inc.), which had come into compliance with the first UAO. In September 1998, EPA entered into a Consent Decree settlement with eleven PRPs, all of which had been recipients of one of the two previously issued UAOs, for continued performance of the RD/RA and recovery of EPA's and NYSDEC's site costs. At the same time, EPA entered into a second Consent Decree settlement with eight other PRPs to recover site costs. EPA entered into two additional cost recovery Consent Decree settlements with a total of five other PRPs, including Dutchess Sanitation Services, Inc.'s successor, the F.I.C.A. Partnership.

Construction of the landfill cap was completed by the PRPs in December 1998. In May 1999, EPA approved a Remedial Action Report prepared by the PRPs' contractor, Killam Associates, which determined that the landfill cap had been completed in accordance with the approved Remedial Design Report and New York State Part 360 solid waste landfill closure requirements. The landfill cap is being monitored and maintained by the PRPs as set forth in the Consent Decree and the EPA-approved Operation and Maintenance Manual. In accordance with the EPA-approved monitoring plan for the site, post-closure monitoring is currently occurring on a biannual basis, and post-closure maintenance is being implemented and reported on a quarterly basis to the agency. In general, the surface water, sediment, and groundwater quality has improved.

SUMMARY OF SEDIMENT, SURFACE WATER AND GROUNDWATER SAMPLING

Sediment and Surface water

Chemical concentrations in sediment and surface water samples collected from the site study area were compiled from several sources.

In 1994, surface water and sediment samples were analyzed for metals, pesticides, polychlorinated biphenyls(PCBs), semi-volatile organic compounds (SVOCs), VOCs, and cyanide. VOCs and SVOCs were detected at all sampling locations, while PCBs were not detected in any samples. Some metals were also detected.

Following the completion of the installation of a landfill cap in 1998, the monitoring program has included annual collection of sediment and surface water samples from three different areas: upgradient of the landfill, along the eastern edge, and downgradient of the landfill. These samples are analyzed for inorganic compounds annually and for organic compounds biannually. The analytical results from the sediment and surface water samples collected in 1999 showed elevated levels of manganese along the eastern edge and downgradient of the landfill in two seep locations which were identified as areas of potential ecological risks. The VOCs and SVOCs previously present in the surface water and sediment samples were no longer detected.

In October 2002, another round of surface water samples was collected and analyzed for inorganic and organic compounds. The results also showed elevated levels of iron and manganese at the same two seep locations along the eastern edge and downgradient of the landfill. The concentrations of iron and manganese in surface water samples were, respectively, 10,750 and 5,890 micrograms per liter (ug/L) at one seep location and 63,000 ug/L and 3490 ug/L at the other. These results exceed NYSDEC ambient water quality standards for iron (300 ug/L) and iron-manganese combined (500 ug/L).

In December 2003, sediment and surface water samples were collected for the analysis of iron and manganese from the two seeps. The results showed elevated levels of contamination. The concentrations of iron and manganese in the sediments were 45,500 and 1,360 mg/Kg, respectively, at one of the seep location and 48,700 and 1,360 mg/Kg at the other seep location. The surface water concentrations of iron and manganese where 10,100 and 2480 ug/L at one seep and 42,600 ug/L and 3,840 ug/L at the other seep location.

The nature and extent of the contamination in the surface water and sediments can be described as follows:

- The recently measured concentrations of iron and manganese in the surface water are similar to the levels reported for the October 2002 sampling event.
- The surface water concentrations of both iron and manganese decrease with distance downstream of the seeps.
- In the surface water, some of the iron samples were found to be at or below the 300 ug/L ambient water quality standard.

Groundwater

The groundwater monitoring program includes sampling of approximately 21 groundwater monitoring wells located at the site and analysis of these samples for organic and inorganic compounds. These groundwater monitoring wells are currently sampled semi-annually, but were sampled on a quarterly basis from December 1996 to January 2001. Iron and manganese are the contaminants which have had the highest concentrations; these concentrations remain elevated. VOCs, that were present in monitoring wells during the remedial investigation, have not been detected since 1999.

The results of the groundwater data show that high levels of manganese, measured 12,005 ug/L which exceeds the preliminary remediation goal (PRG) of 880 ug/L, have persisted in wells distributed along the eastern border of the landfill. Manganese also has been consistently detected above 880 ug/L in a monitoring well and residential wells located as far as approximately 100 feet downgradient of the site at levels ranging from 1,000 to 3,000 ug/L. The manganese concentrations detected in the off-site wells located further downgradient of the site usually did not exceed the PRG.

SUMMARY OF SITE RISKS

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern (COC) at a site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a “reasonable maximum exposure” scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a “one-in-ten-thousand excess cancer risk”; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10^{-6} being the point of departure. For non-cancer health effects, a “hazard index” (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a “threshold level” (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur.

Based upon the results of the RI and the results of subsequent groundwater monitoring, a baseline risk assessment of the site was conducted to estimate the risks associated with current and future site conditions. A baseline risk assessment is an evaluation of the potential adverse human health and ecological effects caused by hazardous substance exposure in the absence of any actions to control or mitigate the exposure to the hazardous substances under current and future land uses.

Human Health Risk Assessment

The purpose of the risk assessment is to identify potential cancer risks and non-cancer health hazards at the site assuming that no further remedial action is taken. A baseline human health risk assessment was performed to evaluate current and future cancer risks and non-cancer health hazards based on the most recent sampling data from the landfill monitoring wells and groundwater samples collected at residences. The sampling data included: landfill monitoring well data collected from January 1998 through October 2002 and residential groundwater data collected in 2001 and 2003.

A four-step risk assessment process was used for assessing site-related cancer risks and non-cancer health hazards. The process includes: Hazard Identification of Chemicals of Potential Concern (COPCs), Exposure Assessment, Toxicity Assessment, and Risk Characterization.

The baseline human health risk assessment began with selecting COPCs in the various media (i.e., groundwater, etc.) that would be representative of potential risks. The COPCs for the landfill included arsenic, iron, lead, manganese, chromium, thallium, and benzene in the groundwater. The COPCs for the residential wells included arsenic and manganese in the groundwater. The potential human receptors evaluated under present and future land use conditions were industrial workers on the landfill site and adult and child residents in the immediate vicinity of the site.

The industrial worker exposure assessment for both current and future land use included the following pathways: ingestion of groundwater and dermal exposure. The cancer risk associated with these pathways for both the current and future industrial worker was 5×10^{-5} (five in one hundred thousand), which is within the acceptable cancer risk range identified in the National Contingency Plan of 1×10^{-4} (one in ten thousand) to 1×10^{-6} (one in one million). The non-cancer hazard did not exceed 1 which is a threshold level below which non-cancer health effects are not expected to occur.

The potential residential exposures included 350 days/year for the child for a period of 6 years. The child residential exposure assessment for both current and future land use included the following pathways: ingestion of groundwater, and dermal exposure. The cancer risk associated with these pathways for both the current and future child resident was 3×10^{-5} (three in one hundred thousand), which is within the acceptable cancer risk range identified in the National Contingency Plan of 1×10^{-4} (one in ten thousand) to 1×10^{-6} (one in one million). The non-cancer hazard did not exceed 1 which is a threshold level below which non-cancer health effects are not expected to occur.

For the adult residential exposure, assumptions included 350 days/year for 24 years. The adult residential exposure assessment for both current and future land use included the following pathways: ingestion of groundwater, and dermal exposure. The cancer risk associated with these pathways for both the current and future adult resident was 6×10^{-5} (six in one hundred thousand), which is within the acceptable cancer risk range identified in the National Contingency Plan of 1×10^{-4} (one in ten thousand) to 1×10^{-6} (one in one million). The non-cancer hazard did not exceed 1 which is a threshold level below which non-cancer health effects are not expected to occur. The residential groundwater data indicated concentrations were below the maximum contaminant levels established under the federal Safe Drinking Water Act to protect drinking water supplies.

EPA also evaluated vapor intrusion as a potential exposure pathway in the baseline human health risk assessment in the event that a building were to be constructed on the landfill site. The sampling data from the landfill monitoring wells were compared to screening criteria. This screening level assessment indicates that the maximum detected concentrations of volatiles in the groundwater on the landfill were all found to be within or below the acceptable risk range (discussed above).

Lead, although not a contaminant of potential concern offsite, was also evaluated based on comparison to the action level of 15 ug/L developed under the federal Safe Drinking Water Act. The analyses found that the average concentration of lead results both on the landfill and in the residences were below the action level.

Ecological Risk Assessment

The purpose of an ecological risk assessment (ERA) is to provide a baseline evaluation of the nature and geographical extent of possible ecological risks based on current environmental conditions.

In March 2003, EPA completed a baseline ecological risk assessment (BERA) of potential ecological risks for aquatic and wetlands areas adjacent to and downstream of the Hertel Landfill. Ecological receptors of concern include sediment-dwelling (benthic) intervertebrates, zooplankton, amphibians, and aquatic-feeding insectivorous birds based on exposure potential and sensitivity. The data from the 1994 through October 2002 sampling efforts were used to identify the COCs and to conduct the exposure and toxicity evaluations of the ecological receptors in the aquatic and wetland habitat.

In the BERA, EPA considered the toxicity test results and analytical data for surface water and sediment. Chemistry data were evaluated to identify the causes of observed toxicity, using methods developed by the EPA to account for site-specific chemical bioavailability and potential toxicity.

EPA found in the BERA that the aquatic and benthic organisms in the majority of the aquatic and wetland habitat adjacent to and downstream of the Hertel Landfill are not at risk due to the COCs. Possible adverse effects on aquatic organisms of COCs are generally limited to two discrete seeps immediately adjacent to the landfill within the entire site. The primary COCs in the two areas are iron and manganese, both of which exceed NYSDEC ambient water quality standards. EPA determined that iron and manganese pose unacceptable levels of risk to aquatic ecological receptors at these two seep locations.

Additional samples were collected in December 2003 to further characterize the nature and extent of iron and manganese at these two seeps. Iron and manganese concentrations at the seeps remain elevated and levels of risk continue to exist at these discrete locations. However, concentrations of iron and manganese in the surface water decreased with distance downstream of the seeps.

Considering EPA's conclusions in the BERA and the results from the October 2002 and December 2003 sampling events, it may be appropriate to consider monitoring the site for the natural recovery of the sediments and the groundwater.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as ARARs and risk-based levels established in the risk assessment.

The objective of the feasibility study (FS) was to identify and evaluate cost-effective remedial action alternatives which would minimize the risk to public health and the environment resulting from groundwater contamination at the site. The 1989 FS report had evaluated in detail five remedial alternatives for addressing the contamination associated with the site. The remedy which EPA selected included capping of the landfill, groundwater extraction, and groundwater treatment through innovative treatment technology. The construction of the landfill cap was completed in December 1998. The landfill cap is being maintained by the PRPs on a quarterly basis.

Given the stability and the improved groundwater quality over the past several years, EPA has decided to re-evaluate the active groundwater extraction and treatment remedy specified in the 1991 ROD in this Post-Decision Proposed Plan. The remedial action objectives for the groundwater remedy are to:

(1) protect human health by ensuring that future residents are not exposed to contaminated groundwater,

(2) reduce the further contamination of the wetlands in the area, and the migration of contaminants in groundwater

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The alternatives for addressing groundwater contamination are provided below and are identified as GW-1 , GW-2 and GW-3. Consistent with EPA guidance documents concerning ROD Amendments, the components of the original remedy proposed for amendment have been updated and are being compared to a new preferred alternative which was developed based upon existing site circumstances. The groundwater remedial alternatives are:

GW-1: No Further Action

The Superfund program requires that the "No Further Action" alternative be considered as a baseline for comparison with the other alternatives.

Table 2: Cost Analysis of GW-1

Capital Cost	$0
O & M Cost	$0
Present Worth Cost	N/A
Construction Time	N/A
Duration	N/A

Under this alternative, EPA would take no further action at the site to prevent exposure to soil and groundwater contamination. The alternative considers remedial activities previously implemented. However, it does not futher reduce impact to groundwater. Under this alternative, the current monitoring program would be discontinued and no institutional controls would be put in place. As a result EPA would be unable to determine if contaminants were leaching to groundwater

Because this alternative would result in some contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the site be reviewed at least once every five years.

GW-2: Preferred Alternative: Institutional Controls and Long Term Monitoring

Capital Cost	$114,000
O & M Cost	$105,000 / yr
Present Worth cost	$1,728,000
Construction Time	immediately
Duration	30 years

Table 3: Cost Analysis of GW-2

The site access has been restricted and the landfill area was capped in December 1998. The cap is being inspected on a quarterly basis as part of the remedy chosen in the 1991 ROD. This alternative would maintain the restricted site access and include a long-term program to monitor the site for the natural recovery of the sediments and the natural attenuation of iron and manganese contamination in groundwater. Under this monitoring program, groundwater, surface water, and sediment samples would be collected and analyzed on an annual basis. In addition, nearby residential wells will be sampled annually. Instituitional controls would be put in place to limit the use of the site for any purpose inconsistent with proper waste management.

Because this alternative would result in some contaminants remaining on-site, CERCLA requires that the site be reviewed at least once every five years. Using data from the groundwater sampling program, these five-year reviews would include the reassessment of health and environmental risks. If justified by a five-year review, additional remedial actions may be implemented in the future.

Alternative GW-3: Existing Remedy (Groundwater Extraction and On-site Innovative Treatment)

Capital Cost:	$810,540
O&M Cost:	$421,860/yr years 0-12 $257,224/yr years 13-17 $48,980/yr years 18-30
Present Worth Cost:	$5,367,567
Construction Time	2 years
Duration:	12 years groundwater extraciton & treatment 30 years cap maintenance

Table 4: Cost Analysis of GW-3

Under this alternative, the remedy chosen in the 1991 ROD would be implemented. This alternative would include the groundwater extraction system that would consist of a series of pumping wells installed around the inside of the landfill. The groundwater pumping wells would extend through the landfill material and end at bedrock. They would be screened through the entire saturated length. It is estimated that approximately 22 extractions wells would be required to provide capture of the contaminated groundwater beneath the landfill. The extracted groundwater would be pre-filtered to remove gross solids and then pumped into an equalization tank. This tank would be utilized to equalize the groundwater flow and contaminant concentrations, which may be variable. The collected groundwater would be treated in an on-site innovative treatment system consisting of a membrane microfiltration unit for inorganic removal and ultraviolet (UV) oxidation for organics removal. The microfiltration system is designed to remove soil particles from liquid wastes using an automatic pressure filter combined with special filter material. Solids greater than one ten-millionth of a meter are retained as a filter cake.

UV oxidation would follow the membrane microfiltration unit. UV oxidation is a process in which UV light and hydrogen peroxide chemically oxidize organic contaminants dissolved in water. The combined UV light and hydroxy radicals (strong oxidizers formed from hydrogen peroxide) promote rapid breakdown of organics into carbon dioxide and water without the creation of air emissions or residual waste streams. The oxidation unit would be operated to reduce the contaminant levels in groundwater to federal or state criteria in accordance with state discharge requirements. Operation and maintenance of the unit would consist of a UV lamp replacement every four months and occasional replenishment of the hydrogen peroxide supply.

EVALUATION OF ALTERNATIVES

In selecting a remedy for a site, EPA considers the factors set forth in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consists of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with applicable or relevant and appropriate requirements addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver.

- Long-Term effectiveness and permanence refer to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

- Short-Term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operation and maintenance costs, and net present-worth costs.

- State acceptance indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred remedy at the present time.

- Community acceptance will be assessed in the ROD Amendment, and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above, follows.

- Overall Protection of Human Health and the Environment

  All alternatives except GW-1 would provide adequate protection of human health and the environment. Both GW-2 and GW-3 are similar in their abilities to protect human health but they are not similar in their abilities to protect the environment. As noted above in the risk assessment section, there are no unacceptable human health cancer risks or non-cancer health hazards associated with the contamination at the site. The site groundwater is not being used as a source of drinking water. In addition, no significant impacts to ecological receptors have been observed. The future and present use carcinogenic risks at the site are within EPA's risk range; however, these risks assume that the site groundwater is utilized as a potable water supply, an event that is highly unlikely into the future.

  As there are no current or anticipated future users of the site groundwater and since the levels of contaminants in the groundwater have stabilized in the last few years, EPA believes that both GW-2 and GW-3 would provide full protection of human health. However, GW-3 does not provide full protection of the environment because if implemented, the system will result in loss of approximately 25-30 % of the wetlands surrounding the landfill.

- Compliance with ARARs

  For Alternative GW-2, ARARs would be achieved over time through Institutional Controls and Long-Term Monitoring; compliance with ARARs would be demonstrated through an annual monitoring program.

  Alternative GW-3 is expected to meet chemical-specific ARARs for the groundwater. However, once pump and treat operations are discontinued, the resumption of contact between the soil / waste matrix and the groundwater may cause chemical-specific groundwater ARARs to be exceeded. If this were to be the case, continued pulse pumping and treatment of the groundwater may be necessary.

- Long-Term Effectiveness and Permanence

  Alternative GW-2 is expected, over time, to provide the same level of long-term effectiveness and permanence as Alternative GW-3. Although GW-3 would potentially achieve cleanup goals in a shorter time-frame than GW-2, it is not expected to be significant. This is supported by the fact that groundwater contaminant levels have remained stable over the past several years. It would also potentially result in the loss of wetlands surrounding the landfill.

  GW-1 offers no long-term effectiveness in terms of protection against against current risks associated with dermal contact with soil contaminants or future groundwater ingestion scenarios.

- Reduction in Toxicity, Mobility or Volume

Alternative GW-2 relies on the cap already constructed at the site; it therefore only reduces the mobility of the soil contaminants through containment measures and natural attenuation, and it does not actively reduce the toxicity, mobility, or volume of contaminants in the groundwater.

Alternative GW-3 would reduce the toxicity, mobility, and volume of contaminated groundwater through treatment and reduce mobility of soil contaminants through containment.

GW-1 provides no reduction in toxicity, mobility or volume of contaminants of any media through treatment. Future risks posed by the site will depend on future site usage.

- Short-Term Effectiveness

  Alternatives GW-1 and GW-2 present virtually no short-term impacts to human health and the environment since no construction is involved. The construction activities required to implement Alternative GW-3 would potentially result in greater short-term exposure to contaminants by workers who would come into contact with the treatment system. While efforts would be made to minimize the impacts, some disturbances would result from disruption of traffic, excavation activities on public and private land, noise, and fugitive dust emissions. However, proper health and safety precautions would minimize this occurrence.

- Implementability

  The three alternatives are available and can be implemented. The technologies proposed for extraction and treatment of contaminated groundwater in Alternative GW-3 are expected to achieve the specified cleanup goals; however, Alternative GW-3 would be much more complex than Alternatives GW-1 and GW-2 to implement. Alternatives GW-1 and GW-2 do not involve any construction and, consequently, are much easier to implement. Alternative GW-2 only requires a monitoring program utilizing existing monitoring wells. The efficiency of Alternative GW-3 would be significantly decreased by the large volumes of relatively clean surface water which would be drawn from the wetlands into the groundwater extraction wells.

- Cost

  The estimated capital, annual operation and maintenance (O&M) (including monitoring), and present-worth costs for each of the alternatives are presented in Table 5.

Table 5: Cost Comparison

Alt.	Capital Cost	Annual O&M	Present Worth
GW-1	$0	$0	N/A
GW-2	$114,000	$105,000	$1,728,800
GW-3	$810,540	Refer to Table 4	$5,367,576

According to the capital cost, O&M cost and present worth cost estimates, Alternative GW-1 has the lowest cost compared to Alternative GW-2 and GW-3.

- State Acceptance

  NYSDEC concurs with the preferred remedy.

- Community Acceptance

  Community acceptance of the preferred remedy will be assessed in the ROD Amendment following review of the public comments received on the Post Decision Proposed Plan.

PREFERRED ALTERNATIVE

Based upon an evaluation of the various alternatives, EPA recommends Alternative GW-2, Institutional Controls and Long-Term Monitoring, as the Post-Decision preferred alternative. Alternative GW-2 provides the best balance of trade-offs among the three alternatives with respect to the evaluating criteria. EPA believes that the preferred alternative will be protective of human health and the environment, will comply with ARARs, will be cost-effective, and will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.